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ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

Revegetating Devastated Sites in New Mexico with Western Wheatgrass Transplants[1]

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Western wheatgrass (*Agropyron smithii* Rydb.) survived well and produced daughter plants from rhizomes during the first year when good seeds were grown to 3-month-old transplants, then transferred to sandy or clay loam sites at elevations of around 7,500 feet.

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Eroding alluvial bottom lands and new road cuts are common sights in the Southwest. Land managers responsible for restoring productivity or reducing erosion on these sites are faced with a difficult problem. The steep slopes and poor soils of road cuts often make direct seeding impossible. Narrow arroyo bottoms and U-shaped sidewalls preclude the use of seeding equipment on some alluvial sites.

Shrub transplants can be used successfully for restoration work in the Southwest (Aldon 1970a). Eighty percent survival was attained after the second growing season with fourwing saltbush (Atriplex canescens) when specific guides were followed (Aldon 1970b, 1972). Little work has been done previously with grass transplants, however.

Grass establishment with transplants, if successful, offers quick cover and rapid spread; hence good soil protection on steep slopes. Two areas having steep slopes and no vegetation were available on the Gila and Cibola National Forests in New Mexico where methods of establishing grass transplants could be tested.

Planting Materials and Procedures

Seedlings of western wheatgrass (Agropyron smithii) were grown outdoors in Albuquerque. Good garden soil was used in 4-inch by 4-inch by 4-inch asphalt honeycomb planting bands. Four seeds were sown in each cell in April when temperatures were optimum (Knipe 1972). Seeds had been treated with a fungicide, and showed high germination potential in independent tests (Knipe 1972). Bands were watered daily until seeds germinated, and were then saturated as needed.

Approximately 2,000 3-month-old seedlings were transplanted at each of two sites in New Mexico. The Snow Lake site is a road cut slope on a newly built road in the pine type of the Gila National Forest near Snow Lake Dam (fig. 1), at an elevation of 8,000 feet. Soils are derived from sandstones of the Gila conglomerate formation. The Continental Divide site is an arroyo bottom near the Continental Divide

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Figure 1.--

Snow Lake road cut site on Gila National Forest:

Before planting;

Immediately after planting;

1 year after planting.

in the pinyon-juniper type on the Cibola National Forest near Thoreau, at an elevation of about 7,400 feet. Annual precipitation is between 11 and 14 inches. Soil is of the Prewitt clay loam series (Williams 1967). Precipitation was recorded at both sites. The Divide site was fenced to prevent grazing.

Seedlings were planted after summer rains began, when laboratory determinations showed that soil moisture stress was less than 1 atmosphere. Four-inch plant bands containing one or more seedlings were planted in holes dug at 2-foot intervals with a posthole digger. Bands were planted flush with the ground surface, and the holes were backfilled and tamped.

Plant survival and evidence of daughter plants from rhizomes were sampled after the first and second growing seasons at the Continental Divide site and after the first growing season and in June of the next year at the Snow Lake site. Twenty random plants were checked in five randomly selected rows in each of four replications.

Results

Survival of western wheatgrass transplants averaged 96.5 ± 0.5 percent after the first growing season (October 1971) at Snow Lake, 86.5 ± 1.9 percent at Continental Divide. Mortality and losses from erosion dropped survival to 86 ± 6.5 percent at Snow Lake in June 1972, and to 82.5 ± 2.5 percent at Continental Divide in October 1972. Daughter plants from rhizomes were visible from 64 percent of the sampled plants after the second growing season. This figure may not be entirely accurate because without excavation it is not possible, in some instances, to determine from which parent plant the shoot arises (fig. 1).

Soil moisture at the time of planting averaged 5 percent on the sandy road cut (Snow Lake) and 14.2 percent on the clay loam alluvial bottom (Continental Divide). In both cases this represented a value of less than 1 atm. moisture tension. Precipitation was about normal at both sites, although long-term averages are not available for the road cut site.

Recommendations

Western wheatgrass transplants can be successfully planted on sandy sites (road cuts in the ponderosa pine type) and clay loam sites (alluvial bottom lands in the pinyon-juniper type) at elevations around 7,500 feet if the following steps are followed:

1. Grow transplants in 4-inch by 4-inch by 4-inch asphalt honeycomb planting bands in good garden soil.
2. Plant tested seed (germination percentages of 95+ should be obtained by your own tests) in bands when outdoor temperatures are optimum (between 55° and 75°C). Keep moist until germination; after that saturate as needed. Thin to one plant per band.
3. Plant transplants in the field at 2-foot spacing when 3 months old. Prevent drying when transporting seedlings to the field and when planting.
4. Plant individual plant bands at ground level when soil moisture at 4 inches is less than 1 atm. tension. Tamp soil firmly around bands.
5. Plant when probabilites for precipitation of a half inch or more are greatest.
6. Soils on the proposed planting sites should be checked to see if they differ widely from the soils used here. If so, small test plantings should be tried first.

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